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(54) **SYSTEM, METHOD AND MOBILE DEVICE FOR REMOTE CONTROL OF A VOICE MAIL SYSTEM**

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This patent is subject to a terminal disclaimer.

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H04L 12/66 (2006.01)
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USPC **370/352**; 379/88.11; 379/88.17

(58) **Field of Classification Search**
USPC 370/352; 379/88.11, 88.17, 352
See application file for complete search history.

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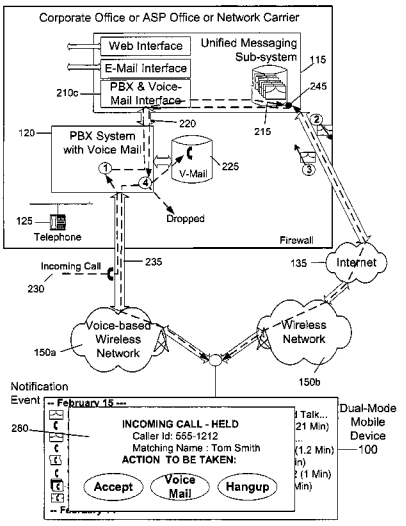
(57) **ABSTRACT**

A unified messaging system, method and user interface is provided for a handheld mobile communication device. The method may include the following steps: (a) receiving a notification signal at the wireless device via the wireless data channel indicating that the unified messaging system received and stored a voice mail message intended for a user of the wireless device; (b) transmitting a command signal from the wireless device to the unified messaging system via the wireless data channel, the command signal including a message retrieval command; (c) receiving via the wireless voice channel a voice call initiated by a voice mail system component of the unified messaging system in response to the message retrieval command transmitted from the wireless device; and (d) receiving the voice mail message from the unified messaging system via the wireless voice channel.

17 Claims, 10 Drawing Sheets



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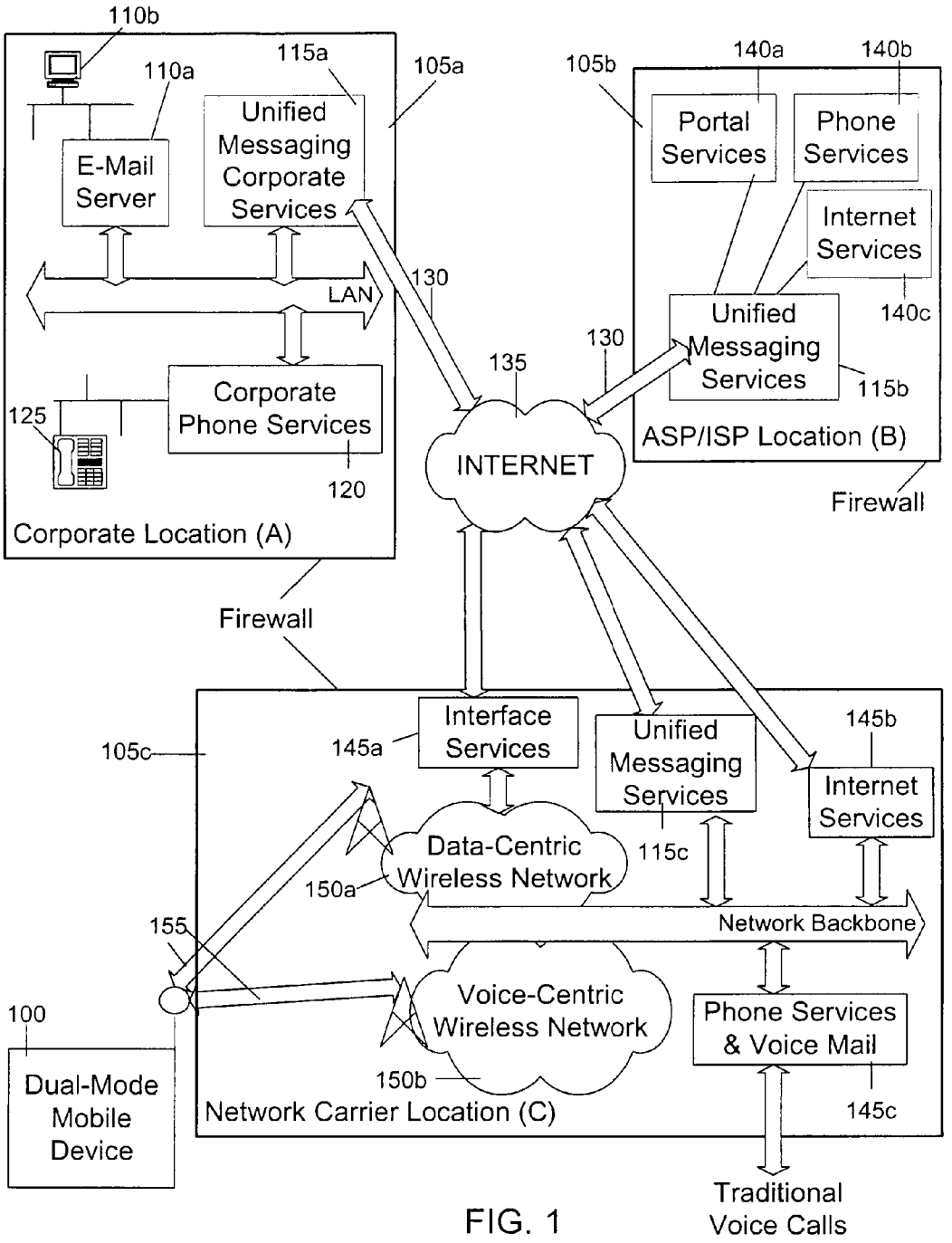
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Unified Messaging Corporate Services
E-Mail Server
Portal Services
Phone Services
Internet Services
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Unified Messaging Services
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Corporate Phone Services
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INTERNET
ASP/ISP Location (B)
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Corporate Location (A)
Firewall
105c
145a
Interface Services
Unified Messaging Services
145b
Internet Services
115c
Data-Centric Wireless Network
150a
155
Network Backbone
Voice-Centric Wireless Network
Phone Services & Voice Mail
100
Dual-Mode Mobile Device
150b
Network Carrier Location (C)
145c
Traditional Voice Calls

FIG. 1

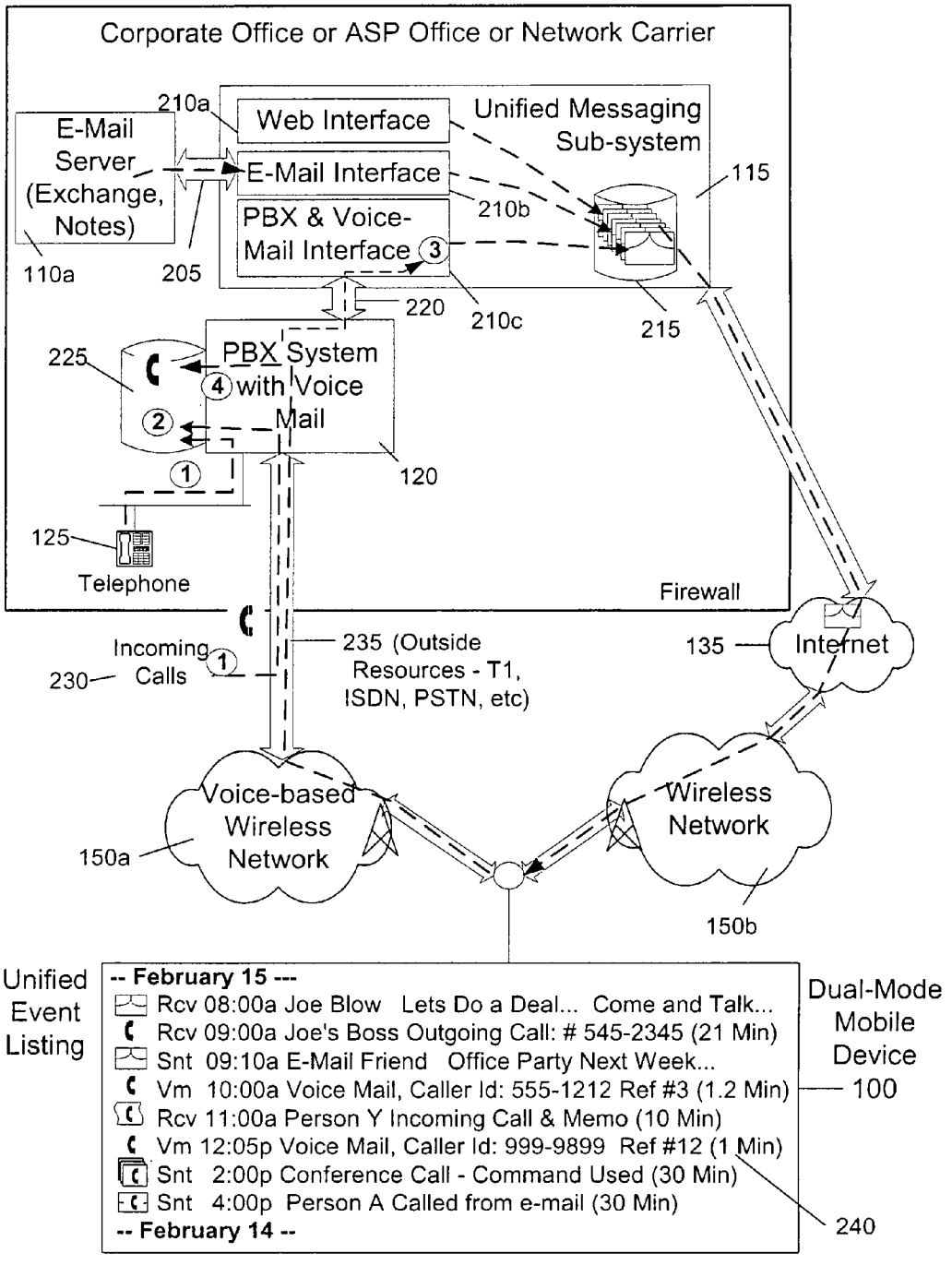
Corporate Office or ASP Office or Network Carrier
210a
Web Interface
Unified Messaging Sub-system
E-Mail Server (Exchange, Notes)
E-Mail Interface
210b
115
PBX & Voice-Mail Interface
3
110a
205
220
210c
215
225
PBX System with Voice Mail
4
2
1
120
125
Telephone
Firewall
Incoming Calls
230
1
235 (Outside Resources - T1, ISDN, PSTN, etc)
135
Internet
Voice-based Wireless Network
150a
Wireless Network
150b
Unified Event Listing
-- February 15 ---
Rcv 08:00a Joe Blow Lets Do a Deal... Come and Talk...
Rcv 09:00a Joe's Boss Outgoing Call: # 545-2345 (21 Min)
Snt 09:10a E-Mail Friend Office Party Next Week...
Vm 10:00a Voice Mail, Caller Id: 555-1212 Ref #3 (1.2 Min)
Rcv 11:00a Person Y Incoming Call & Memo (10 Min)
Vm 12:05p Voice Mail, Caller Id: 999-9899 Ref #12 (1 Min)
Snt 2:00p Conference Call - Command Used (30 Min)
Snt 4:00p Person A Called from e-mail (30 Min)
-- February 14 --
Dual-Mode Mobile Device
100
240

FIG. 2

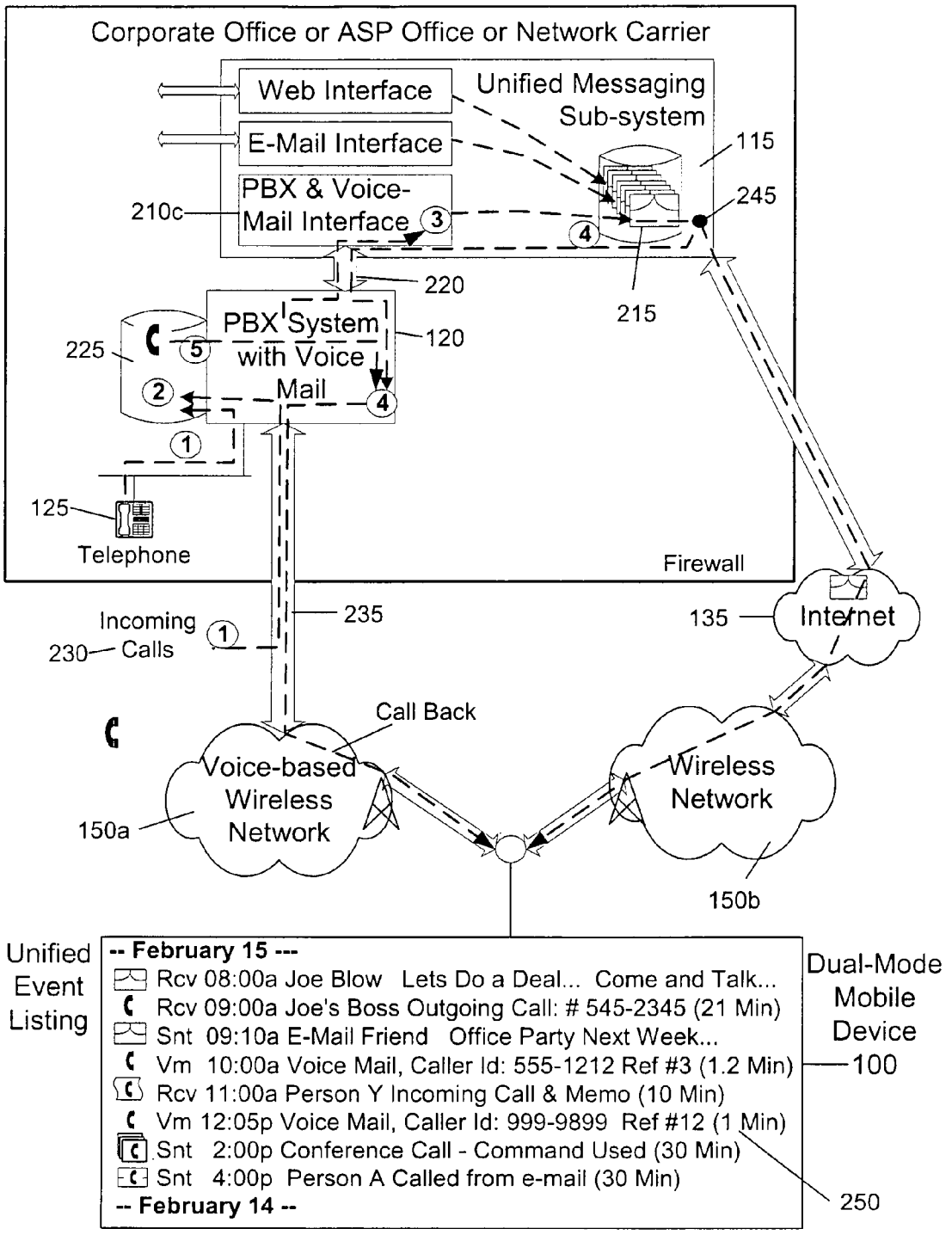
Corporate Office or ASP Office or Network Carrier
Web Interface
E-Mail Interface
PBX & Voice-Mail Interface
Unified Messaging Sub-system
115
245
210c
220
215
PBX System with Voice Mail
120
225
125
Telephone
Firewall
Incoming Calls
230
235
135
Internet
Call Back
Voice-based Wireless Network
150a
Wireless Network
150b
Unified Event Listing
-- February 15 ---
Rcv 08:00a Joe Blow Lets Do a Deal... Come and Talk...
Rcv 09:00a Joe's Boss Outgoing Call: # 545-2345 (21 Min)
Snt 09:10a E-Mail Friend Office Party Next Week...
Vm 10:00a Voice Mail, Caller Id: 555-1212 Ref #3 (1.2 Min)
Rcv 11:00a Person Y Incoming Call & Memo (10 Min)
Vm 12:05p Voice Mail, Caller Id: 999-9899 Ref #12 (1 Min)
Snt 2:00p Conference Call - Command Used (30 Min)
Snt 4:00p Person A Called from e-mail (30 Min)
-- February 14 --
250
Dual-Mode Mobile Device
100

FIG. 3

Opening an Item in the Event Listing Screen

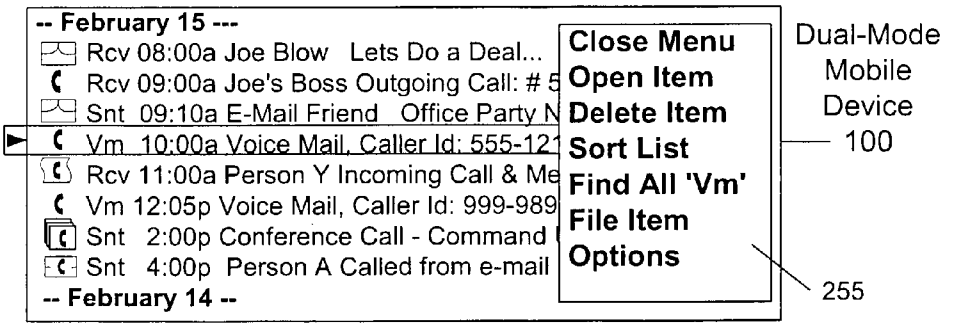
-- February 15 ---
Rcv 08:00a Joe Blow Lets Do a Deal...
Rcv 09:00a Joe's Boss Outgoing Call: # 5
Snt 09:10a E-Mail Friend Office Party N
Vm 10:00a Voice Mail, Caller Id: 555-121
Rcv 11:00a Person Y Incoming Call & Me
Vm 12:05p Voice Mail, Caller Id: 999-989
Snt 2:00p Conference Call - Command
Snt 4:00p Person A Called from e-mail
-- February 14 --
Close Menu
Open Item
Delete Item
Sort List
Find All 'Vm'
File Item
Options
Dual-Mode Mobile Device 100
255

FIG. 4a

Voice Mail Message - Choice Screen

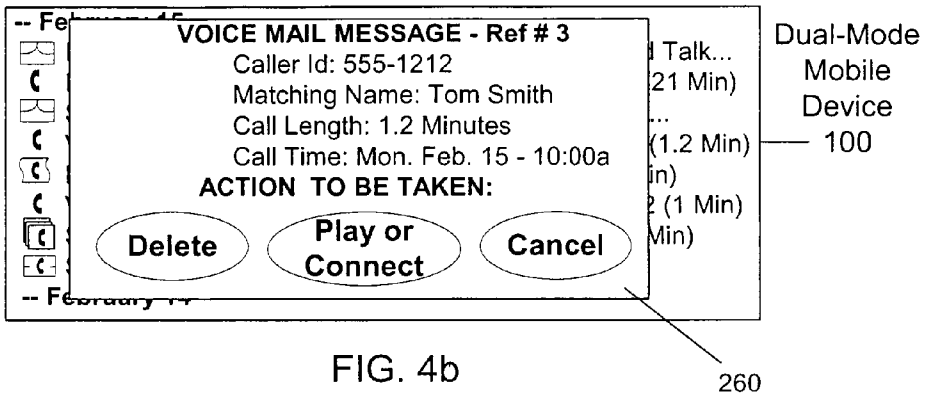

FIG. 4b

Voice Mail DTMF Interface

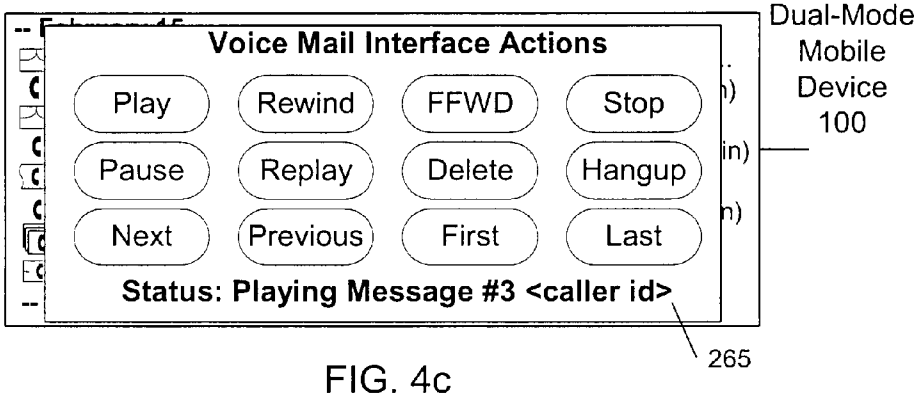

FIG. 4c

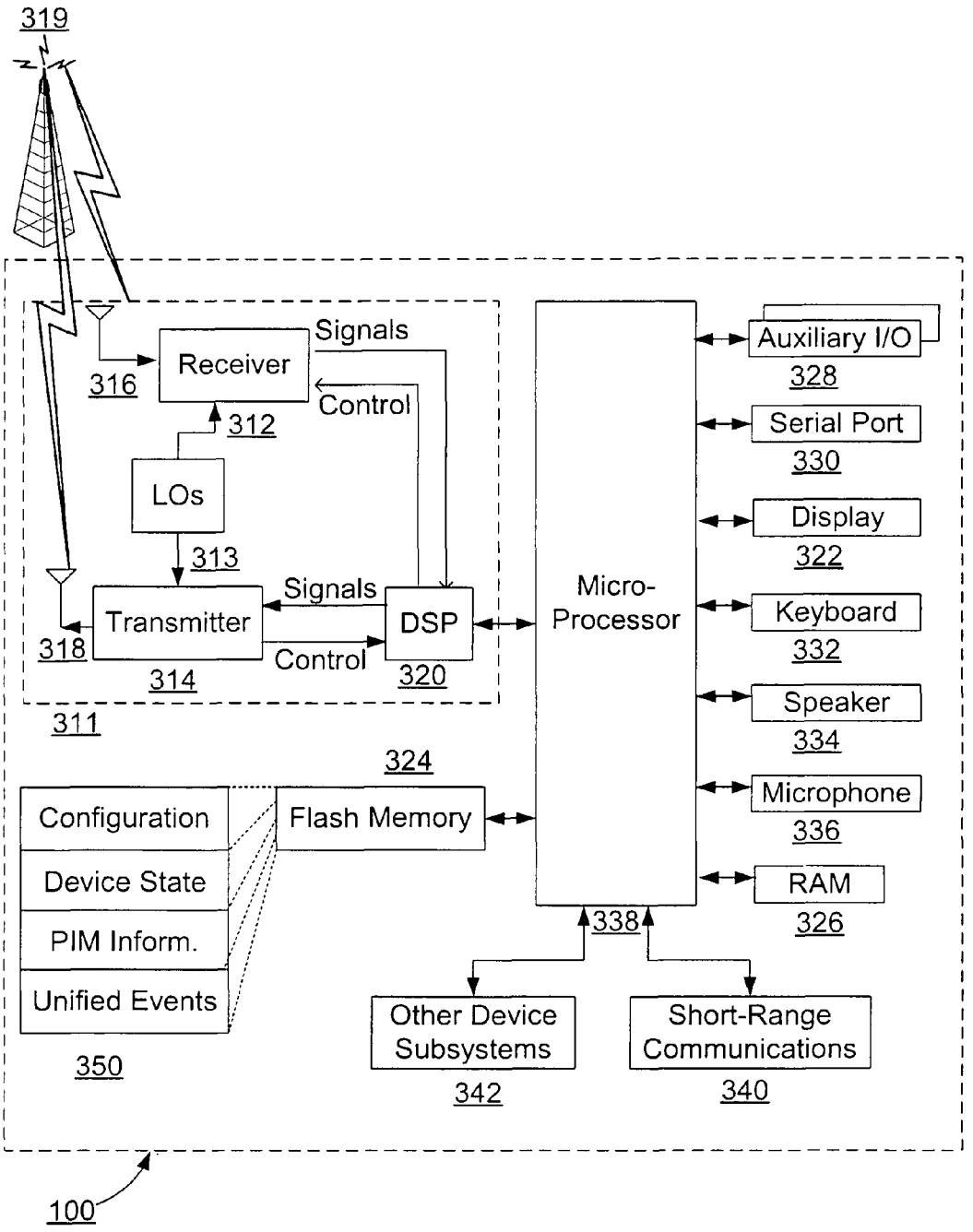
319
316
Receiver
Signals
Control
312
LOs
313
Transmitter
Signals
Control
DSP
318
314
320
311
Micro-
Processor
Auxiliary I/O
328
Serial Port
330
Display
322
Keyboard
332
Speaker
334
Microphone
336
RAM
326
324
Configuration
Device State
PIM Inform.
Unified Events
Flash Memory
350
338
Other Device
Subsystems
342
Short-Range
Communications
340
100

FIG. 5

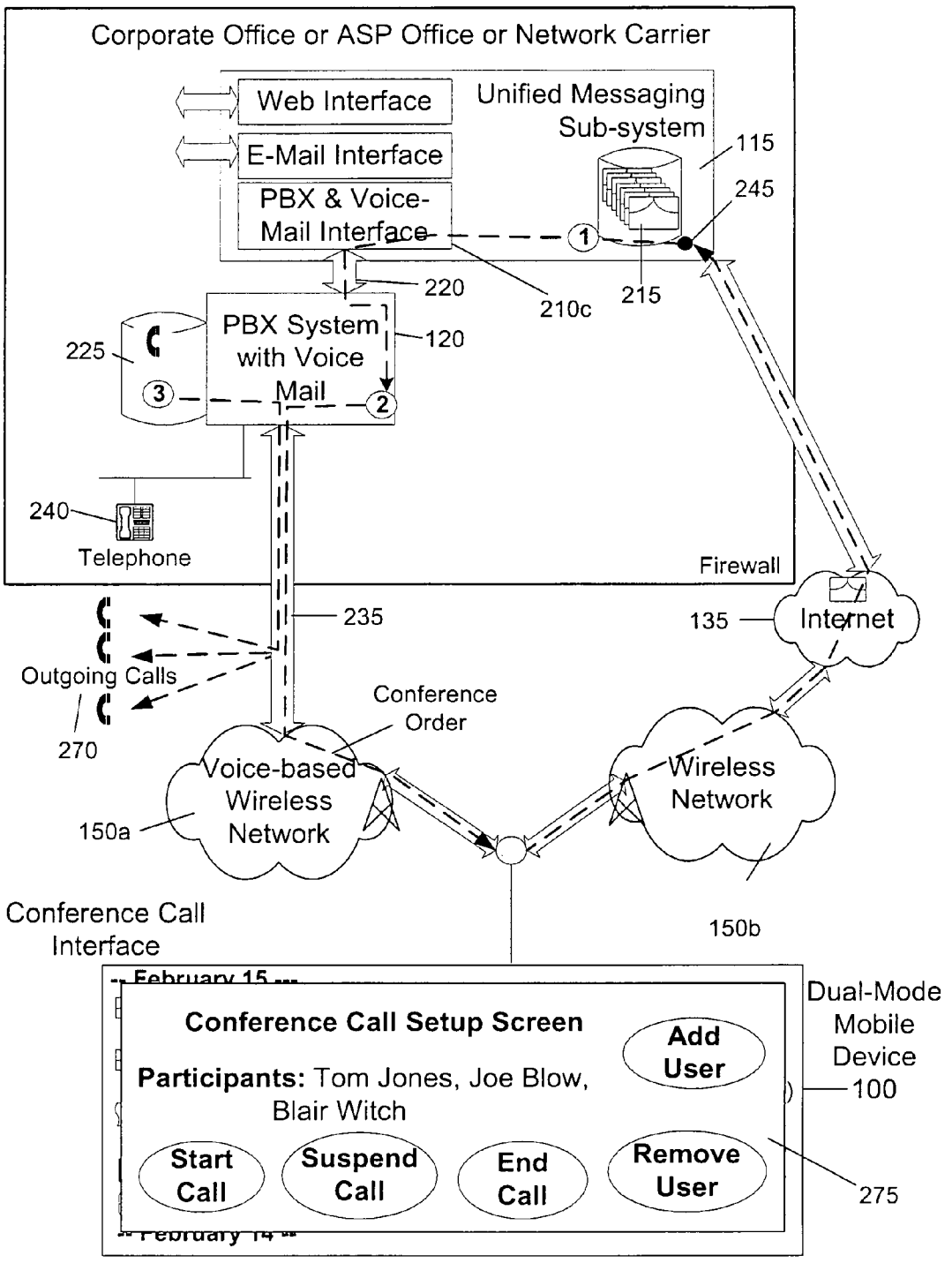
Corporate Office or ASP Office or Network Carrier
Web Interface
E-Mail Interface
PBX & Voice-Mail Interface
Unified Messaging Sub-system
115
245
220
210c
215
PBX System with Voice Mail
120
225
240
Telephone
Firewall
235
135
Internet
Outgoing Calls
270
Conference Order
Voice-based Wireless Network
150a
Wireless Network
Conference Call Interface
150b
Conference Call Setup Screen
Participants: Tom Jones, Joe Blow, Blair Witch
Add User
Start Call
Suspend Call
End Call
Remove User
275
Dual-Mode Mobile Device
100

FIG. 6

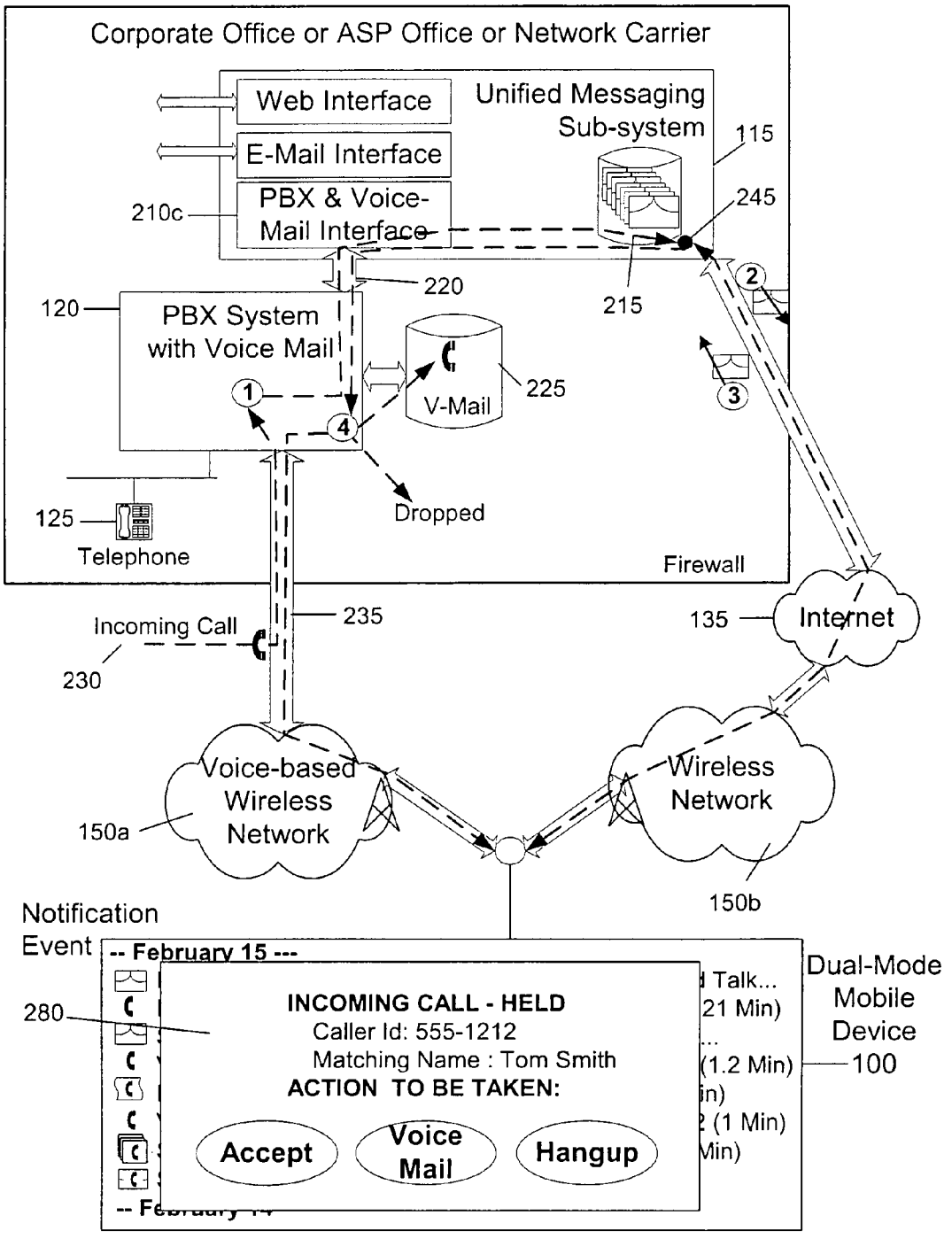
Corporate Office or ASP Office or Network Carrier
Web Interface
E-Mail Interface
PBX & Voice-Mail Interface
210c
Unified Messaging Sub-system
115
245
215
220
120
PBX System with Voice Mail
V-Mail
225
1
2
3
4
Dropped
125
Telephone
Firewall
Incoming Call
230
235
135
Internet
Voice-based Wireless Network
150a
Wireless Network
150b
Notification Event
-- February 15 ---
INCOMING CALL - HELD
Caller Id: 555-1212
Matching Name : Tom Smith
ACTION TO BE TAKEN:
Accept
Voice Mail
Hangup
280
Dual-Mode Mobile Device
100

FIG. 7

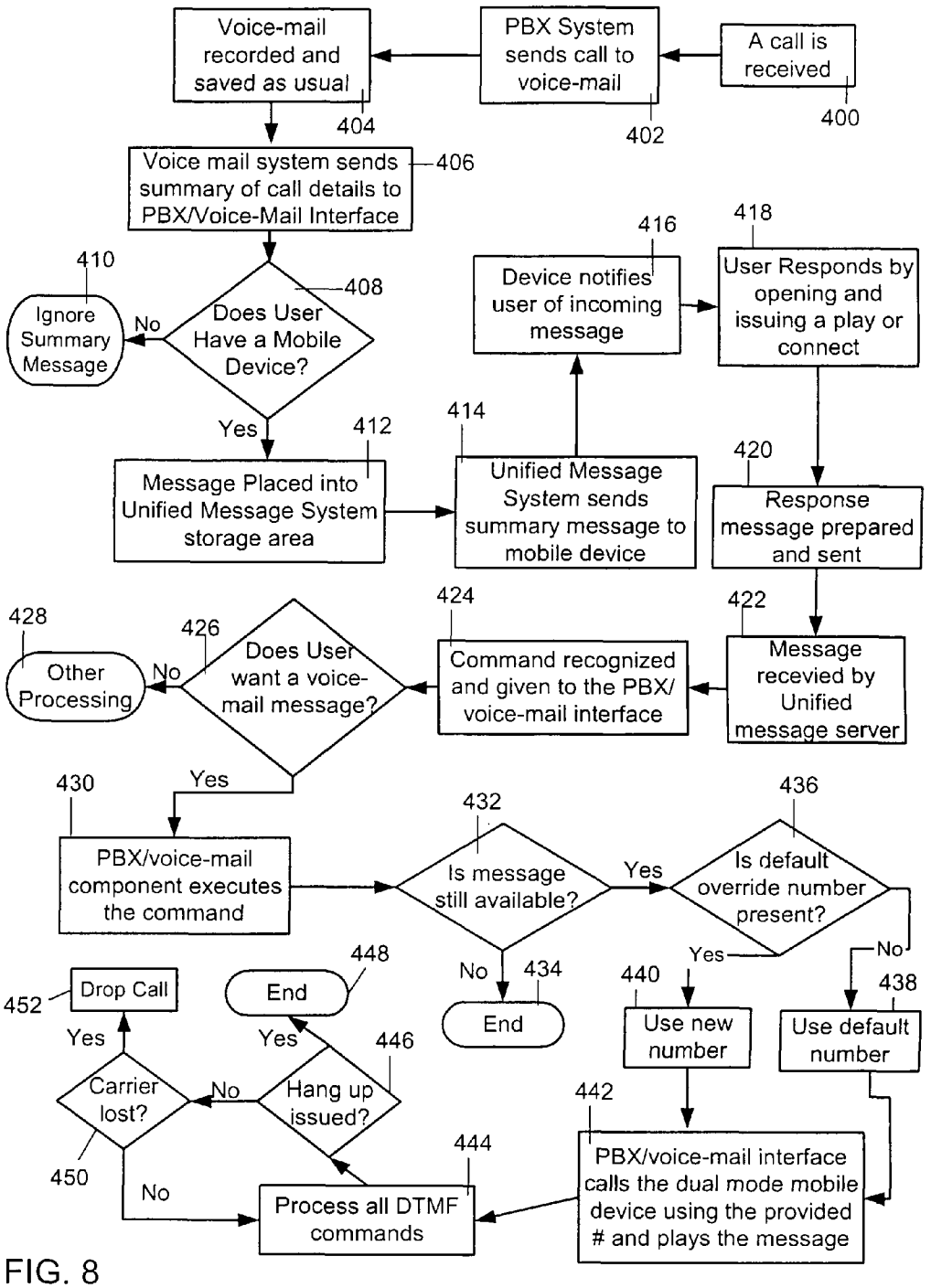
A call is received
400
PBX System sends call to voice-mail
402
Voice-mail recorded and saved as usual
404
Voice mail system sends summary of call details to PBX/Voice-Mail Interface
406
Does User Have a Mobile Device?
408
No
Ignore Summary Message
410
Yes
Message Placed into Unified Message System storage area
412
Unified Message System sends summary message to mobile device
414
Device notifies user of incoming message
416
User Responds by opening and issuing a play or connect
418
Response message prepared and sent
420
Message recevied by Unified message server
422
Command recognized and given to the PBX/ voice-mail interface
424
Does User want a voice-mail message?
426
No
Other Processing
428
Yes
PBX/voice-mail component executes the command
430
Is message still available?
432
Yes
No
End
434
Is default override number present?
436
Yes
No
Use new number
440
Use default number
438
PBX/voice-mail interface calls the dual mode mobile device using the provided # and plays the message
442
Process all DTMF commands
444
Hang up issued?
446
Yes
No
End
448
Carrier lost?
450
Yes
No
Drop Call
452

FIG. 8

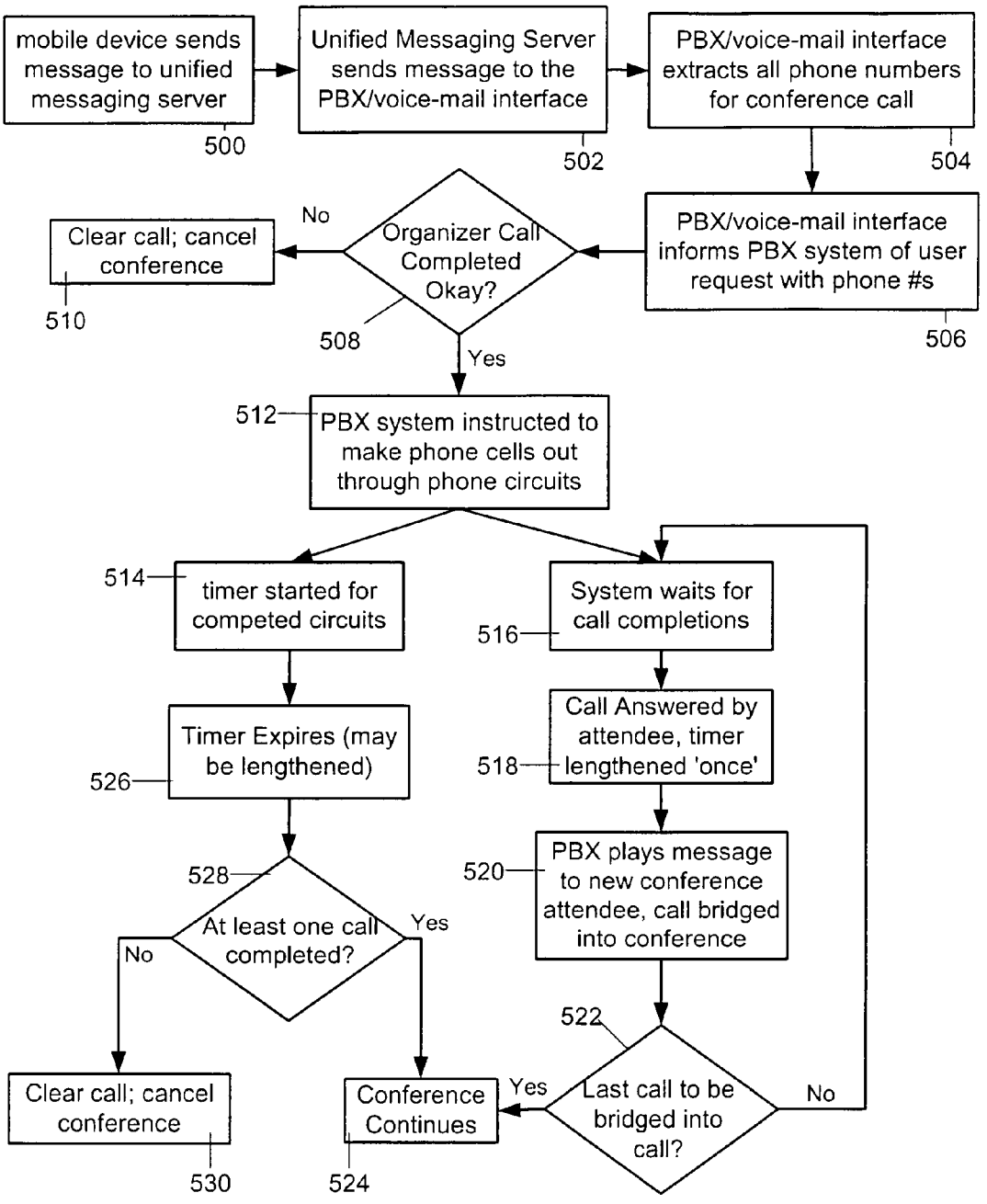
mobile device sends message to unified messaging server
500
Unified Messaging Server sends message to the PBX/voice-mail interface
502
PBX/voice-mail interface extracts all phone numbers for conference call
504
PBX/voice-mail interface informs PBX system of user request with phone #s
506
Organizer Call Completed Okay?
508
No
Clear call; cancel conference
510
Yes
512
PBX system instructed to make phone cells out through phone circuits
514
timer started for competed circuits
Timer Expires (may be lengthened)
526
528
At least one call completed?
No
Yes
Clear call; cancel conference
530
Conference Continues
524
516
System waits for call completions
Call Answered by attendee, timer lengthened 'once'
518
520
PBX plays message to new conference attendee, call bridged into conference
522
Last call to be bridged into call?
Yes
No

FIG. 9

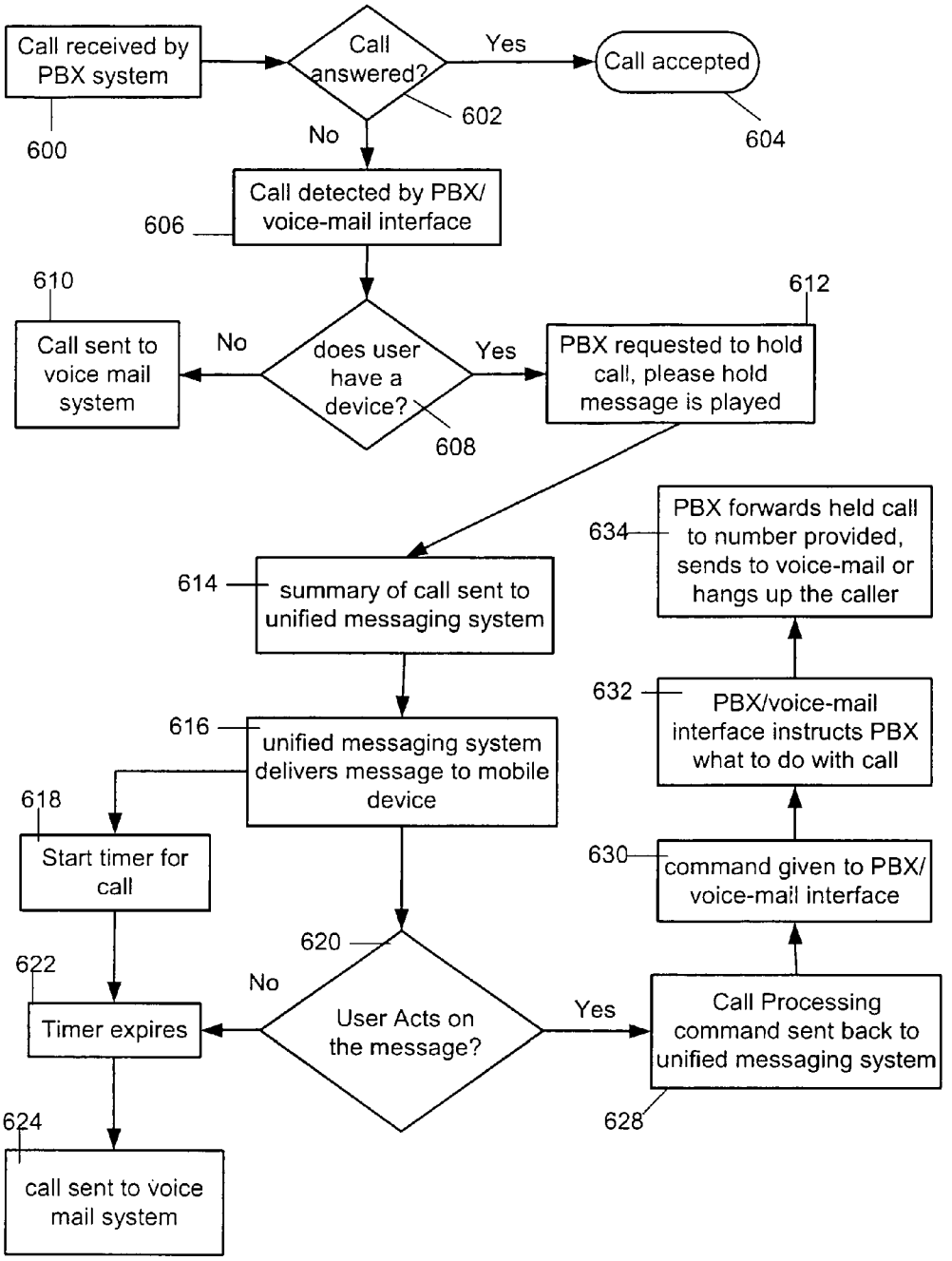
Call received by PBX system
600
Call answered?
602
Yes
Call accepted
604
No
Call detected by PBX/ voice-mail interface
606
610
Call sent to voice mail system
No
does user have a device?
608
Yes
612
PBX requested to hold call, please hold message is played
614
summary of call sent to unified messaging system
616
unified messaging system delivers message to mobile device
618
Start timer for call
620
622
Timer expires
No
User Acts on the message?
Yes
624
call sent to voice mail system
628
Call Processing command sent back to unified messaging system
630
command given to PBX/ voice-mail interface
632
PBX/voice-mail interface instructs PBX what to do with call
634
PBX forwards held call to number provided, sends to voice-mail or hangs up the caller

FIG. 10

SYSTEM, METHOD AND MOBILE DEVICE FOR REMOTE CONTROL OF A VOICE MAIL SYSTEM

CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation of U.S. application Ser. No. 10/051,697 filed on Jan. 18, 2002, now U.S. Pat. No. 7,283,808 B2.

This application also claims priorty from U.S. Provisional Application Ser. No. 60/262,575 filed on Jan. 18, 2001. Both of these prior application are hereby Incorporated be reference into this application.

BACKGROUND

1. Field of the Invention

The present invention is directed toward remote control of a host system with a dual-mode mobile communications device (mobile device). Specifically a method is disclosed for seamlessly integrating PBX services, including voice mail services, into a mobile device for control by the user.

2. Description of the Related Art

There are very few systems that allow remote control of host systems from mobile devices. There are no known solutions that use a dual-mode mobile device to remotely control PBX and voice mail systems. In the area of related art the closest solution known to the author uses a browser-like method for controlling file viewing, file printing and file re-routing like to a fax machine. Some of these solutions can also act like a terminal emulator and thus allow the user to login to the company network and act like any other terminal user. These types of solutions are very far from what is described in this patent. In the field of phone technology there are also methods to call a service provider and turn call forwarding on or off, and change the call forwarding number. In this area an individual home phone, office phone, or cell phone can adjust some of the operating parameters but this has no multi-discipline effect on both voice and data information.

It is naturally possible to use two devices to perform some of the actions described in this patent, but these solutions have lots of problems and are prone to errors. For example one device is inevitably turned off, or has out of battery, or is out of reach in a suitcase or a travel bag. The elegance of having full control over the PBX and voice system is the ideal solution. There is also the problem of costs for all these devices to solve problems of data and voice notifications. By adding costs and requiring multiple devices to solve simple problems the number of users will to purchase such a solution goes down very quickly. Finally, there is a complete lack of elegance when two devices are required to deal with both voice and data to proper control over the host system. The mobile user expects simplicity and ease of use when deal with notifications, and acting upon notifications.

Therefore, there remains an important area of remote control of a host system, from a dual-mode mobile communication device, that has not been satisfied.

SUMMARY

A unified messaging system, method and user interface is provided for a handheld mobile communication device. The method may include the following steps: (a) receiving a notification signal at the wireless device via the wireless data channel indicating that the unified messaging system received and stored a voice mail message intended for a user of the wireless device; (b) transmitting a command signal from the wireless device to the unified messaging system via the wireless data channel, the command signal including a message retrieval command; (c) receiving via the wireless voice channel a voice call initiated by a voice mail system component of the unified messaging system in response to the message retrieval command transmitted from the wireless device; and (d) receiving the voice mail message from the unified messaging system via the wireless voice channel.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an overview of where the invention is used in three different environments where PBX and voice-mail systems can reside;

FIG. **2** shows one embodiment of the invention as used by a mobile device user to retrieve voice mail;

FIG. **3** shows a second embodiment of the invention as used by a mobile device user to retrieve voice mail;

FIGS. **4***a*, **4***b* and **4***c* are examples of three control screens seen by the user of the mobile device when they interact with the unified messaging system;

FIG. **5** is an overview of a wireless dual-mode device showing all the major hardware components in the system;

FIG. **6** is an illustration of how conference call is established using the mobile device as the conference call initiator;

FIG. **7** is an illustration of how an incoming call can be held and controlled by the user of a mobile device;

FIG. **8** is a data flow diagram showing the steps necessary to request a voice-mail message by sending a data message to a unified messaging server;

FIG. **9** is a data flow diagram showing the steps necessary to set up a conference call via a data message sent to a unified messaging server; and,

FIG. **10** is a data flow diagram showing the steps necessary to process a held call via a data message sent to a unified messaging server.

DETAILED DESCRIPTION

A. Overview of the System

With reference to FIG. **1** this diagram provides an overview to the environment where the invention is used. The first component in the illustration is a dual-mode mobile device **100** ("mobile device"). This mobile device **100** is shown as having Radio Frequency ("RF") connections to both a data-Centric wireless network **150***a* and a voice-Centric wireless network **150***b*. The voice-centric network **150***b* preferably provides circuit switched communication connections. Although these networks are shown as separate, one skilled in the art will appreciate that it is now possible for a single network like GSM/GPRS to support both cell phone and data traffic through the same network infrastructure. Another component in FIG. **1** is the unified messaging service **115**, which can reside in many places. Unified messaging is well known in the field of land-line data communications, but it applicability to wireless mobile devices has not proceeded due to a lack of integration of functionality in the mobile device. In this context the unified messaging service can be used either in the corporate environment (A), the Application Service Provider (ASP) or Internet Service Provider (ISP) environment (B), or within the wireless network carrier location (C). Functionally the unified messaging service attempts to unify different sources of information and events for a given user. One goal of this unifying is to provide a single source for information, events, messages and voice traffic so that orga-

nization is simplified. As shown in FIG. **2**, this unification may include a complete database and storage area **215** that contains messages and events that have been sent to the mobile device **100**. Other major features include: one addressing method to reach users, less time for information retrieval by the user of the mobile device **100** and an accurate chronological ordering to events and information on the mobile device **100**.

B. Remote Control Over Voice-Mail System

Turning now to FIG. **1** there is presented three different information centers **105***a*, **105***b*, **105***c* all capable of communicating to a dual-mode mobile device ("mobile device") **100**. Each information center has a set of services that could be used with a unified messaging service **115***a*, **115***b*, **115***c* to provide a range of information to the mobile device **100**. The unified message service **115** also co-ordinates the activities and notifications to the mobile device **100**, through its links to the wireless network **150**. The voice-centric wireless network, or more traditionally the cellular network, also provides the ability to reach each information center **105**. For example a mobile device **100** can call into a voice-mail center, through a Private Automatic Branch exchange ("PBX") to retrieve voice mail messages. This kind of activity is common for cell phone users today. For this mobile device **100**, the cell-phone support is just one part of the functionality which resides within the mobile device **100** beside the data capabilities. These communication methods are not mutually exclusive and both could be operating simultaneously or cooperatively together on the same mobile device **100**.

The components that make up a unified messaging solution can vary, depending on the sophistication of the unified messaging service and the goal of the service provider. Generally all services are protected by a firewall environment, this is especially important as most services are accessible through the Internet **135**. Unified messaging services **115** can include but is not limited to e-mail support, web site access and phone/voice-mail services. By leveraging the data component of the unified messaging service **115**, the phone services component can provide notification and other types of features. Where necessary the unified messaging service **115** uses the Internet to exchange information with the worldwide web, and with mobile devices **100**. Within most corporate locations (A) the availability of phone services is standard. The corporation often has PBX access to allow the corporate phone system access to a certain capacity of phone circuits from the phone company. Many companies also purchase additional services with their PBX system. Such additional service include Interactive Voice Response (IVR) systems to provide call routing, call services and voice-mail. When calls arrive into the corporate user, the system is programmed to ring the desktop phone of the user for a certain number of rings before sending the call to voice-mail. As shown in detail in FIG. **2**, the voice-mail component after receiving the voice-mail is then able to inform the user via a data command sent through the unified messaging service. In one embodiment, the notification may be provided by adding a new voice-mail data element in the inbox of the user's unified inbox such as the inbox for users of Microsoft Exchange. In an alternative embodiment, this notification can take place through wireless e-mail, short messaging service (SMS), enhanced messaging service (EMS), multi-media messaging service (MMS) or the Internet Messaging Service (IMS). The invention can also be used with an application service provider (ASP) or an Internet service provider (ISP) **105***b*. An example of an ASP service would include a private network like America On Line's ("AOL™") network, MSN.com, or some other 802.11 network standard-like LAN capable of exchanging information at extremely high rates. Within an ASP or ISP **105***b* environment (B) there are a range of services **140** for customers of the ISP/ASP. As ISP's try to differentiate themselves they are finding it necessary to offer advanced portal, messaging and phone services. In this environment (B), similar to the corporate environment (A), there can be a unified messaging service available for mobile devices **100**. The unified messaging service unifies all messaging and data services so that the mobile device **100** is able to present these events to the mobile device **100** user in a consistent and harmonious fashion.

Both the corporate location (A) and the ISP/ASP (B) have links to the Internet **135** for exchanging information with mobile devices **100**, and for general Internet **135** access for information and content. This physical connection **130** would use a range of existing data communication technologies including but not limited to Ethernet, Cable Modem, DSL, ISDN, Frame Relay over any number of physical cables like T1 or fiber. These connections will not be discussed with other diagrams, as they are very well known by those skilled in the art.

The term wireless network **150** has been used in two contexts (1) the data-centric wireless network **150***a* and (2) the voice-centric wireless network **150***b*. For one skilled in the art, it has been stated that these two networks can be merged into one single network that can support both voice and data communications over the same physical network. The newest of these combined networks include, but are not limited to (1) the Code Division Multiple Access (CDMA) network, (2) the Groupe Special Mobile or the Global System for Mobile Communications (GSM) and the General Packet Radio Service (GPRS) both developed by the standards committee of CEPT, and (3) the future third-generation (3G) networks like EDGE and UMTS. GPRS is a data overlay on-top of the very popular GSM wireless network. Some older examples of data-centric network include, but are not limited to: (1) the Mobitex Radio Network ("Mobitex"), which has been developed by Eritel and Ericsson of Sweden, and is operated by Cingular in the United States, and (2) the DataTAC Radio Network ("DataTAC"), which has been developed by Motorola and is operated by American Mobile Satellite Corporation (AMSC) now called Motient, in the United States.

The network carrier location (C) **105***c* preferably includes the necessary infrastructure that makes up the wireless network **150**, and other supporting computers. For one skilled in the art the components within the wireless network **150** are well known and include base stations, and routing nodes like SGSN and GGSN nodes in a GSM/GPRS network. As network carriers are trying to differentiate their services, and acquire greater revenue from the wireless user, they are installing value-added services **145**. These include unified messaging services **115***c*, Internet services like portals **145***b* and phone services **145***c*. A phone service, to support basic calls to cell phones, has been part of cellular networks since their creation. Some of services include, but are not limited to: voice-mail support, call forwarding, call holding, call waiting and advanced 411-call dialing. Network carriers **105***c* are also installing advanced services that support inter-connection between services. This allows for voice-mail systems to inform mobile device **100** users when voice-mail messages have been deposited into their voice-mailbox. This invention then allows these same users to take the next step and act upon that notification seamlessly from their mobile device.

With reference to FIG. **2** this overview diagram illustrates how a unified messaging service can interoperate with the PBX and voice-mail system to give the user a user-friendly remote control over that voice mail system from the user's mobile device. Using the unified messaging system **115** as a

focus, this Figure illustrates how a notification message can be sent out, through an interface to the voice-mail system, to a mobile device **100**. After reception the mobile device **100** can react to the notification in a way that seamlessly causes the voice-mail system to play the voice-mail message without necessarily downloading over-the-air that voice-mail message onto the mobile device.

Turning now to FIG. **2** there is a much more complex illustration of all the data exchanges and relationships between the various components of the system FIG. **2** also shows the relationship between the unified message subsystem and other sub-systems like e-mail and PBX systems. The PBX system **120** links to local telephones **125**, and supports plain old telephone service (POTS) lines **235**. When used within a network carrier environment, the PBX system **120** might also provide SS7 gateway support for cell phone connections. Voice-mail support has a data store **225** for saving voice messages and other IVR configuration data. E-mail connections might use Internet standards like POP3 or IMAP4 to Unix mail systems, or proprietary interfaces like Microsoft's MAPI, or Lotus Notes API for corporate mail servers Corporate e-mail servers like 'Microsoft Exchange™, or Lotus Notes™ are just two of the hundreds of e-mail systems available in the marketplace today.

In this first embodiment, the first step (**1**) is the arrival of incoming phone calls for a given user, that is out of the office. These phone calls **230** can be coming from the outside world, over a T1 line or some other truck line, or coming from other phones **125** within the company PBX system **120** The company's PBX system **120** gets no answer at the user's desktop and performs step (**2**) by sending the call to the voice-mail system **225**. This voice-mail system may be a direct part of the existing PBX, or an added solution, i.e. a separate physical computer system. The PBX and voice-mail system **120** will place the call in the user's voice-mail mailbox **225** until it is played, forwarded, deleted or accessed in some other action by the user. Naturally, the voice-mail solution **120** stores a large number of voice mail messages, and each voice message is given an identifier or reference number so the user can proceed through them in an orderly fashion. Interfacing to the voice-mail system is a voice-mail interface **210***c*, which uses an Application Program Interface (API) to interact with the voice-mail system and the PBX system. This is similar to the API used to access mail **210***b*, previously referenced as POP3 or IMAP4. Additionally, a web interface might exist **210***a* for access Internet content and web pages.

At step (**3**) the voice-mail interface **210***c* detects the arrival of a new voice-mail message saved in the message store **225**. If there is a mobile device **100** configured for that voice-mail mailbox, then the unified messaging system **115** sends a notification message of the call to the mobile device **100**. Configuration information for the unified messaging system is preferably kept within a database for all mobile device **100** users **215**. In one embodiment, this database might have both configuration information and actual messages being delivered to mobile devices **100**. These messages serve as references for the user in case they want to perform additional functions, like getting more data of an e-mail message. The notification message is sent to the mobile device **100** through the Internet via the wireless network; except if the unified messaging server **115** resides in the network carrier's infrastructure domain, then it can send directly to the mobile device **100** via the wireless network. The notification message preferably includes one or more of the following pieces of information:

message waiting indicator—this is an indicator or flag in the header of a the notification message. Where a SMS message means is used as the notification message, the message waiting indicator indicates it is a voice mail notification type of SMS message.

Voice-mail message reference identification—this uniquely identifies the message within the user's voice mailbox at the user's voice mailbox.

Voice-mail access telephone number—for calling back into the voice mail system.

Caller ID—calling line identity of the caller who left the voice mail message, if available.

Date and time of call

The summary message preferably contains information like the caller id, message call length, message reference number, time it was received and any other information it can get from the caller information. In an alterative embodiment, the unified messaging component is fully integrated into the PBX and voice-mail system **120**. In this embodiment, there is only one piece of software that performs both these functions.

Once the user has received the summary message of the voice mail message on the mobile device **100** they are notified using several methods. The device might begin to vibrate, it might give an audible tone or a combination of both. The user then has the option of responding to the message by opening it and performing the next action. The user might also choose to ignore the message and it will reside in the unified event listing **250** that shows all voice and data events in a single event listing. The unified event listing is preferably a reflection of the events that occurred in the unified messaging server **115** (such as, but not limited to incoming email messages received at the user's account at the user's office, faxes received at a fax number associated with the user, voice mail messages) and within the mobile device **100** by the user (such as, but not limited to outgoing email messages generated at the mobile device, telephone call logs). This list can be sorted by the user to show all chronological events, only outgoing e-mail events, only outgoing phone events, incoming phone events or any other category of event available on the mobile device **100**. A summary message or summary descriptor preferably comprises of one or more information elements. In a preferred embodiment, the one or more information elements includes one or more of the following: an graphical icon, a time stamp of when the event was received on or transmitted from the mobile, subject line and sender's name.

In this embodiment, the next step occurs when the user of the mobile device **100** opens the voice-mail summary message to listen to the message. A summary of one type of visual display used on the mobile device **100** is shown in FIG. **4***a*. In this screen the user has exposed a menu of actions **255** that allows the user to perform an action on an item in the unified event listing. As illustrated, the user has already selected an item in the list, shown by the arrowhead. The methods to perform this action might include, but are not limited to using: a touch-screen interface, a roller wheel, a mouse button, cursor keys or some other navigation method. In this situation, the user further selects the "Open Item" action and reveals all the details of the event, which causes FIG. **4***b* to appear to the user. In this example the detailed information provided in the voice mail message **260** shows the caller id, a matching address book entry for the caller id, if present, the recorded message length, and the time the call was taken. For one skilled in the art, there could be many other screen presentations and choices. In this example, the user can select Delete, Cancel or Play/Connect. The delete selection could mean to delete the locally stored voice mail summary message, or both the locally stored voice mail summary message and the associated voice mail message stored in association with the voice mail server. The cancel selection could possibly clear

this dialog box and return to the unified event listing **255**. The play/connect selection might either play the message, or connect to the PBX and voice-message system **120**. Once the play/connect action is selected, the screen moves to FIG. **4***c*. During this display the mobile device **100** is performing actions behind the scenes.

Once the user selects the Play/Connect action, the mobile device **100** takes step **4** shown on FIG. **2**. Turning back to FIG. **2** step **4**, this embodiment causes a circuit switch, cellular call to be made to the PBX/Voice-mail system **120**. The actual phone number of the PBX/voice-mail system (and any password or DTMF access codes associated with accessing the voice-mail system of the mobile device user) could be in the original voice-mail summary message, or could be pre-configured/stored into the mobile device **100**. To improve the integration of the solution, the PBX/voice-mail system is either configured to recognize the mobile device's incoming caller Id information, or the mobile device plays a secret DTMF tone sequence to uniquely identify it from the plurality of other mobile devices. To further enhance security both caller ID information and the DTMF-based password may be used to authenticate the mobile device user. It is preferable that both the outgoing call to the PBX/voice-mail system and any exchange of DTMF tones between the mobile device and the voice mail system are accomplished without the need for user input or user intervention (i.e., no need to type in the password). In a preferred embodiment, the mobile device suppresses the DTMF tones associated with initiating and connecting an outgoing call to the PBX system/voice mail system. In the preferred embodiment, the DTMF tones may identify the particular voice mail message to act on. In this manner, the retrieval of voice mail messages is seamless and transparent to the mobile device user. After this step is complete, the voice-mail interface **120** and the mobile device **100** preferably automatically exchange DTMF tones to communicate. The DTMF tones can be pre-configured into the application on the mobile device **100**, or the user could configure them depending on what the voice-mail DTMF commands are expected by the PBX system. For example, to play a voice mail message, the voice mail server may expect three 1s from the mobile device. In this case, the mobile device may be pre-configured to output three 1s as DTMF tones to the voice mail server when the user presses play. Turning to FIG. **4***c*, there is an example list of the types of commands **265** that would be useful for a voice-mail system **120**. For one skilled in the art, he or she understands that this is only an example list of commands. Some of the commands might have specific actions, like the hang-up command, would drop the communication link to the voice-mail server **120**. In advanced voice-mail systems, **120** the normal hierarchical interactive voice response interface might be collapsed so that shorter, direct DTMF commands take the user directly to final actions.

Turning now to FIG. **3**, in this second embodiment the first three steps are preferably similar to those described in FIG. **2**. In step (**1**) a call arrives in for the user through the PBX system **120**. It comes from a local company user **125**, or from the outside world **230**. Step **2** occurs because the user is away from their desk, so the message is placed into voice-mail storage **225**. In step **3**, the voice-mail interface component **210***c*, preferably within the unified messaging system **115**, detects the voice-message has been stored or received and sends a notification message of the voice mail message through the wireless data network **150***b* to the mobile device **100**. The notification message preferably includes one or more of the following information: telephone number of the PBX to make into all into, telephone number of caller, length of voice mail message and an identifier of the voice mail message. Upon receipt of the notification message, a summary message is preferably generated at the mobile device based on information from the notification message. As shown in FIG. **4** the user sees the message **250** and has the option of opening the message as in FIG. **2**. After opening the message the user selects the Play or Connect option, a data message leaves the mobile device **100**. In this embodiment, the data message is a command to the unified messaging sub-system to request the PBX/voice-mail interface to initiate a circuit-switched call to the mobile device **100**. The command is preferably sent via the wireless data network **150***b* from the mobile device and includes the identifier of the voice mail message. The unified messaging system **115** preferably is awaiting for such incoming commands from the mobile device **100**. A central command processor **245** is present to watch for a particular command sequence, or some other data component. This command could be exchanged in e-mail, where the subject line, or the body has a special character sequence to indicate that a PBX/voice-mail command is present. The email preferably would include the identifier of the voice mail message. In this manner, email may be the transport mechanism for remotely managing the PBX/voice-mail system.

In step **5** the voice-mail interface **210***c* uses preferably the PBX/voice-mail API calls to provide an outgoing voice circuit where a call is made preferably to the configured number for that user or the mobile device. The user is able to override this number by configuring another number in the mobile device **100** that will accompany the data command. Otherwise if the override number is absent, the default number will be used. There are several advantages to this method. First, the method provides greater security for both systems. The PBX/voice-mail system knows which mobile device number to call, and an incoming connection cannot be impersonated. This security can be further improved by removing the option within the mobile device **100** to override the default cell phone number. Secondly, in some wireless cellular networks the costs of accepting an incoming cell phone call is less then making an outgoing cell phone call.

When the PBX/voice-mail system **120** calls the mobile device, the mobile device may be configured to recognize the caller Id of the PBX/voice-mail system **120**. This ability to recognize the incoming call is from the PBX/voice-mail system preferably allows the incoming call to be automatically accepted by the mobile device without the need for user input or user intervention (i.e., press the "talk" or "pick up" button to accept the incoming). In a preferred embodiment, the mobile device suppresses the ring tones or other notification of incoming calls (i.e., vibration) associated with such incoming call. In one embodiment, the user of the mobile device is not prompted for voice mail system passwords, etc. In this manner, the retrieval of voice mail messages is seamless and transparent to the mobile device user. This seamless integration is possible because of the coordinated design between the two systems (the voice mail system and the mobile device). Similarly in FIG. **4***c*, each time a DTMF tone is played by the mobile device to the voice-mail system, the user preferably does not hear these DTMF tones as the mobile device's speakers are preferably muted or suppressed. Once the user is done interacting with voice-mail they can perform the hang-up command action that would terminate the incoming voice circuit-switched connection.

C. Mobile Device Description

Turning now to FIG. **5** there is a block diagram of a mobile device **100** in which the invention may be implemented. The mobile device **100** is preferably a two-way communication device having at least voice and data communication capa-

bilities. The device preferably has the capability to communicate with other computer systems on the Internet. Depending on the functionality provided by the device, the device may be referred to as a data messaging device, a two-way pager, a cellular telephone with data messaging capabilities, a wireless Internet appliance or a data communication device (with or without telephony capabilities).

Where the device **100** is enabled for two-way communications, the device will incorporate a communication subsystem **311**, including a receiver **312**, a transmitter **314**, and associated components such as one or more, preferably embedded or internal, antenna elements **316** and **318**, local oscillators (LOs) **313**, and a processing module such as a digital signal processor (DSP) **320**. As will be apparent to those skilled in the field of communications, the particular design of the communication subsystem **311** will be dependent upon the communication network in which the device is intended to operate. For example, a mobile device **100** destined for a North American market may include a communication subsystem **311** designed to operate within the Mobitex™ mobile communication system or DataTAC™ mobile communication system, whereas a mobile device **100** intended for use in Europe may incorporate a General Packet Radio Service (GPRS) communication subsystem **311**.

Network access requirements will also vary depending upon the type of network **319**. For example, in the Mobitex and DataTAC networks, mobile devices such as **100** are registered on the network using a unique personal identification number or PIN associated with each device. In GPRS networks however, network access is associated with a subscriber or user of a device **100**. A GPRS device therefore requires a subscriber identity module (not shown), commonly referred to as a SIM card, in order to operate on a GPRS network. Without a SIM card, a GPRS device will not be fully functional. Local or non-network communication functions (if any) may be operable, but the mobile device **100** will be unable to carry out any functions involving communications over network **319**. When required network registration or activation procedures have been completed, a mobile device **100** may send and receive communication signals over the network **319**. Signals received by the antenna **316** through a communication network **319** are input to the receiver **312**, which may perform such common receiver functions as signal amplification, frequency down conversion, filtering, channel selection and the like, and in the example system shown in FIG. **5**, analog to digital conversion. Analog to digital conversion of a received signal allows more complex communication functions such as demodulation and decoding to be performed in the DSP **320**. In a similar manner, signals to be transmitted are processed, including modulation and encoding for example, by the DSP **320** and input to the transmitter **314** for digital to analog conversion, frequency up conversion, filtering, amplification and transmission over the communication network **319** via the antenna **318**.

The DSP **320** not only processes communication signals, but also provides for receiver and transmitter control. For example, the gains applied to communication signals in the receiver **312** and transmitter **314** may be adaptively controlled through automatic gain control algorithms implemented in the DSP **320**.

The mobile device **100** preferably includes a microprocessor **338** which controls the overall operation of the device. Communication functions, including at least data and voice communications, are performed through the communication subsystem **311**. The microprocessor **338** also interacts with further device subsystems such as the display **322**, flash memory **324**, random access memory (RAM) **326**, auxiliary input/output (I/O) subsystems **328**, serial port **330**, keyboard **332**, speaker **334**, microphone **336**, a short-range communications subsystem **340** and any other device subsystems generally designated as **342**.

Some of the subsystems shown in FIG. **5** perform communication-related functions, whereas other subsystems may provide "resident" or on-device functions. Notably, some subsystems, such as keyboard **332** and display **322** for example, may be used for both communication-related functions, such as entering a text message for transmission over a communication network, and device-resident functions such as a calculator or task list.

Operating system software used by the microprocessor **338** is preferably stored in a persistent store such as flash memory **324**, which may instead be a read only memory (ROM) or similar storage element (not shown). Those skilled in the art will appreciate that the operating system, specific device applications, or parts thereof, may be temporarily loaded into a volatile store such as RAM **326**. It is contemplated that received communication signals may also be stored to RAM **326**. As shown the flash memory can be segregated into different areas for both computer programs **358**, and program data storage **350**, **352**, **354** and **356**. These different PIM storage types indicate that each program can allocate a portion of flash memory **324** for their own database requirements. Also shown as part of flash memory are sample memory elements **350**. This might include but are not limited to configuration information, either entered by the user or part of the manufacturing process, device state information, like the current radio network and region being used, address book information and other PIM information like calendar, tasks and to do lists.

The microprocessor **338**, in addition to its operating system functions, preferably enables execution of software applications on the device. A predetermined set of applications that control basic device operations, including at least data and voice communication applications for example, will normally be installed on the mobile device **100** during manufacture. A preferred application that may be loaded onto the device may be a personal information manager (PIM) application having the ability to organize and manage data items relating to the device user such as, but not limited to e-mail, calendar events, voice mails, appointments, and task items. Naturally, one or more memory stores would be available on the device to facilitate storage of PIM data items on the device. Such PIM application would preferably have the ability to send and receive data items, via the wireless network. In a preferred embodiment, the PIM data items are seamlessly integrated, synchronized and updated, via the wireless network, with the device user's corresponding data items stored or associated with a host computer system. Further applications may also be loaded onto the mobile device **100** through the network **319**, an auxiliary I/O subsystem **328**, serial port **330**, short-range communications subsystem **340** or any other suitable subsystem **342**, and installed by a user in the RAM **326** or preferably a non-volatile store (not shown) for execution by the microprocessor **338**. Such flexibility in application installation and/or remote voice-mail system configuration increases the functionality of the device and may provide enhanced on-device functions, communication-related functions, or both. For example, secure communication applications may enable electronic commerce functions and other such financial transactions to be performed using the mobile device **100**.

In a data communication mode, a received signal such as a text message or web page download will be processed by the communication subsystem **311** and input to the microproces-

sor **338**, which will preferably further process the received signal for output to the display **322**, or alternatively to an auxiliary I/O device **328** A user of mobile device **100** may also compose data items such as email messages for example, using the keyboard **332**, which is preferably a complete alphanumeric keyboard or telephone-type keypad, in conjunction with the display **322** and possibly an auxiliary I/O device **328**. Such composed items may then be transmitted over a communication network through the communication subsystem **311**.

For voice communications, overall operation of the mobile device **100** is substantially similar, except that received signals would preferably be output to a speaker **334** and signals for transmission would be generated by a microphone **336**. Alternative voice or audio I/O subsystems such as a voice message recording subsystem may also be implemented on the mobile device **100**. Although voice or audio signal output is preferably accomplished primarily through the speaker **334**, the display **322** may also be used to provide an indication of the identity of a calling party, the duration of a voice call, or other voice call related information for example.

The serial port **330** in FIG. **5** would normally be implemented in a personal digital assistant (PDA)-type communication device for which synchronization with a user's desktop computer (not shown) may be desirable, but is an optional device component. Such a port **330** would enable a user to set preferences through an external device or software application and would extend the capabilities of the device by providing for information or software downloads to the mobile device **100** other than through a wireless communication network. The alternate download path may for example be used to load an encryption key onto the device through a direct and thus reliable and trusted connection to thereby enable secure device communication.

A short-range communications subsystem **340** is a further optional component which may provide for communication between the mobile device **100** and different systems or devices, which need not necessarily be similar devices. For example, the subsystem **340** may include an infrared device and associated circuits and components or a Bluetooth™ communication module to provide for communication with similarly-enabled systems and devices.

D. Remote Control Over PBX System

Another aspect of the invention is a direct remote control over the office PBX system **120**. The illustration shown in FIG. **6** closely follows the description provided in FIG. **3**. In this illustration, the user of the mobile device **100** wants to set up a conference call. To perform this action, the user sends one or more commands through his mobile device to the unified messaging server **115** to request the resources of the associated PBX system **120**. The example of a conference call is just one type of PBX service that could be requested using this method. Other methods that could also be used include, but are not limited to: a point-to-point call with one other person, calling a company extension, forwarding a voice-mail call to another number and other advanced call processing. Another embodiment, could also allow the user to submit data messages that would be converted from text to speech. This could include text messages to change the daily greeting, text messages to record extended absence prompts and other similar voice-mail related voice prompts.

Turning now to FIG. **6** in this third embodiment of the invention, the user of the mobile device **100** sends a command to the unified messaging system **115** to request resources from the PBX system **120**. The unified messaging server **115** then performs an action on behalf of the user based on the command that requests voice circuits from the PBX server **120** which in turn eventually engages the voice component of the mobile device **100**. In step (**1**) of FIG. **6** the user of the mobile device **100** invokes a conference initiate screen **275**. This is just one example screen—there are many ways to present this information to a user of a small handheld mobile device. In this example, the user selects the conference participants or conferencees, most likely via an address book or contact database on the mobile device **100**. Conferencees may be added or subtracted as needed until the user/conferencor is satisfied that the correct number of conferencees is present. This activity could also be preformed from the calendar program on the device. In this embodiment, the calendar entry contains all the participants of a meeting, each is presented to the user when the time expires for the meeting. The user then confirms the participants and the meeting starts. Once the conference participants of the conference are selected the Start Call button is selected. This results in taking step (**1**) of this embodiment, where the mobile device **100** sends a conference request command to the unified messaging service **115**. The unified messaging service **115** recognized the command **245**, and does not treat the message like data. As already mentioned, this command could come in an e-mail and have a special subject, or body command string that is being monitored to identify the e-mail as containing commands for a conference call. The command is then passed over to the PBX/voice-mail interface **210***c*, which interfaces to the PBX system **120** to perform the requested actions. The command preferably includes the command type, the necessary phone numbers and any other necessary information to correctly execute the command submitted.

Step (**2**) now takes places as the PBX and voice-mail interface **210***c* uses the applicable API to request resources from the PBX component **120**. For our example this command is a request to set up a multiple-person conference call using the telephone numbers provided by the user in the original command. Preferably, the PBX system **120** sets up a voice call to the mobile device **100** since the mobile device is the requestor of the conference call and must be present. In step (**3**) the PBX system **120** then makes all necessary phone calls using phone circuits to call the other parties **270** specified by the user. In our example there are three calls shown, this could be reduced or increased depending on the system. As user's pick up the call they could be played a canned message, like 'You are joining an electronically established conference call'. The organizer of the conference call might hear a beep or a signal each time a new caller is connected. Alternatively, as each new conferencee is successfully contacted by the PBX (a new voice call connection is established), the voice call connection may be promptly connected to the mobile device to establish the conference call. Step (**3**) completes when at least one call is established and the call proceeds. During the call the user that initiated the conference may 'suspend the call' or 'end the call'. These actions would also be sent using commands back through the wireless network data channel to the unified messaging server **115**. Alternatively, the mobile device, through user input, could play DTMF tones to the PBX system **120** to change the state of the conference call.

There are many advantages to establishing a conference call using this method including, but not limited to: cost savings to the user of the mobile device **100**, there is improved reliability in establishing the call, and there is a time savings as conference calls can take a lot of effort to get established on a mobile phone. The increased reliability to the mobile user is realized if the mobile user happens to roam during the call itself. If the mobile phone goes into dead areas, or the call is dropped by the base stations, the circuit will be lost during the conference. If this were to happen the PBX system **120** would

be programmed to re-call the user and establish the call again. In this way the PBX system **120** act as a proxy owner of the conference, not the mobile user, thus increasing the reliability and ensuring the conference continues despite bad wireless network coverage situations.

Turning now to FIG. **7** there is yet another embodiment of how a dual-mode mobile device **100** can use their data channel to remote control voice events to their handheld device. In this example the mobile device user **100** receives a call into their land-line phone number. This could be a number provided by an ASP/IPS, network carrier or within their corporate office. Unlike FIGS. **2** and **3**, the user has configured the PBX system **120** to hold the call and send a notification that the call has arrived (step (**1**). Step (**1**) summaries the incoming call with information that includes, but is not limited to: the caller Id, time of the call and any matching name information from preferably a locally stored address book. The summary message is given to the PBX and Voice-mail interface quickly and get delivered to the mobile device **100** quickly. Step (**2**) is the delivery of the message indicating a call has arrived and is on hold. During this time the calling party might be played a message like 'Please Hold while we contact the 'Joe Blow' for you'. If for some reason the command is delayed, or the mobile device **100** is out of coverage, the the incoming call is timed out and placed into voice-mail **225**. However in most cases the command does reach the user of the mobile device **100** and they act upon the message.

The incoming notification event might cause a dialog box to appear **280**, similar to that shown in FIG. **7**. This dialog box simply shows the caller Id, matching name and any other summary information that can be extracted from the caller. The user can then direct the PBX system **120** what to do with the call. In this case all commands will cause a response to go back to the unified messaging server **115**. In step (**3**) the command reaches the unified messaging server **115** and it detects the command and gives it to the PBX and Voice-mail interface **210***c*. The command response will have a reference identifier for the held call so that the PBX and voice-mail interface **210***c* can direct the PBX system **120** what to do with the caller. In step (**4**) the PBX system acts upon the command and either sends the call to voice-mail **225**, drops the caller, i.e. hangs up immediately, or redirects the call to the mobile device **100**. The user can even provide an override to the default phone number in the command response if necessary to tell the PBX system **120** where to send the caller.

Turning now to FIG. **8** there is a data flow diagram for the steps necessary to perform one embodiment of the invention. In this illustration the user of the mobile device **100** is requesting to play a voice-mail message. This data flow follows the steps shown in FIG. **3**; although comments about FIG. **2** will also be mentioned. The data flow starts when a call is received for the user **400**. The call is handled by the PBX system **120** and directed to the user's phone, which could be a phone number hosted by a network carrier, an ISP or an ASP **402**. Since the user is not present the PBX system directs the call to voice-mail where a message is recorded and stored **404**. Since the PBX/voice-mail interface is monitoring all activity through the available API, it is informed or detects the new voice message arrival. It then builds a summary of the call via the API, and determines the Id of the user receiving the voice-mail message **406**. The PBX/voice-mail interface then determines if the user that received the voice-mail message has a mobile device **100** capable of supporting this advanced functionality **408**. If the user does not have a mobile device **100**, then the summary message is not sent to the wireless network **150***b* and the voice-mail message is ignored **410** (the user may access the voice-mail message as he or she traditionally would from his or her desktop telephone at, for example, the office). Otherwise the summary message is placed in the unified messaging system storage area to be scheduled for delivery to the mobile device **412**. The unified messaging system then sends a summary of the message to the mobile device user **414**. The mobile device user **100** is then notified following the setting on the mobile device **416**. The user responds immediately, or at a later date, to the voice-mail summary message that is shown in the unified event screen. The user opens the message and selects a Play or Connect while viewing the details of the message **418**. In the embodiment described in FIG. **2** and FIG. **3**, this is where the two methods vary. In FIG. **2** the next step is to call the PBX system and proceed from step **430**. In the embodiment described by FIG. **3** the mobile device **100** prepares a response message containing the voice-mail message reference number, an overriding callback phone number, any authentication information for security, and any other pertinent information **420**. The message is then sent and received by the unified messaging server **422**. The command is recognized and the type matches a voice-mail command, so it is given to the PBX/voice-mail interface **424**. The PBX/voice-mail interface determines that the user wants to play-back a previously recorded message, and provides the necessary information to locate and execute this command **426**. If the command is not a voice-mail playback command then the invention proceeds to process one of the many other types of commands that have been discussed **428**. Otherwise the PBX/voice-mail interface proceeds to start executing the command **430**. The first step is to determine if the voice-mail message is still available in storage **432**. If the message cannot be found the processing ends for this command **434**. Otherwise the PBX/voice-mail interface determines if there is an override number present **436**. If there is no override number then the configured default number for the mobile device user is used **438**. If an override number is present then the override callback number is used **440**. The PBX/voice-mail interface then calls the mobile device **100**, using PBX phone circuit resources **442**. The mobile device **100** recognizes the incoming call from the PBX system and accepts it automatically. In one embodiment, the user is preferably not notified of the incoming call from the PBX and the accepting step is accomplished without user involvement. A voice call is then established between the mobile device and the PBX for access of voice mail system functionality. At this point, the user is able to interact with the PBX and voice mail system **120** through a voice mail graphical user interface **260**, **265** on the mobile device. Upon selection of one or more of the voice mail GUI menu items, the mobile device can issue control signals, for receipt by the voice mail system, to initiate the action associated with the selected menu item. In one preferred embodiment, the control signals are DTMF tones or a sequence thereof associated with the requested action. Preferably, said issuance is accomplished with the speaker of the mobile device muted or suppressed so that the user is not necessarily hearing said DTMF tones to thereby provide a more user friendly, seamless and transparent user interface to the voice mail system. It should be understood that an audible notification of the selected voice mail action has started or ended is still possible while still suppressing said DTMF tones. The user might simply listen to the requested message, they might delete the message, forward the message or simply hangup. The user might also go to the previous message, the next message or scan their entire voice-mailbox for a certain message. A test scan is performed to watch for a hangup command **446**, and if one is entered by the user the call is ended **448**. The system also watches for the loss of the carrier, indicating the

user simply hung-up on the call without using the menu options **450**. If the carrier is lost spontaneously the call is ended **452**. Otherwise the system loops around and continues to watch DTMF tones for processing **444**. At some point the user completes the call and either issues a hangup command, or drops the carrier on the phone circuit.

Turning now to FIG. **9** this is a data flow diagram that illustrates the steps in FIG. **6**. In this embodiment the mobile device **100** is requesting a conference call via a data command sent to the unified messaging system **115**. The first step in this data flow diagram when the user decides to construct a conference call command **500**. The command contains the conference request, the names and optionally the phone numbers of the other attendees in the conference and any security information that might be needed. This message is sent to the unified messaging server **115** and it identifies the message as a PBX/voice-mail command and gives it to the PBX/voice-mail interface component **502**. The PBX/voice-mail interface extracts the phone numbers, mobile device **100** identifier and other information from the command **504**. The PBX/voice-mail interface interacts with the PBX and passes the numbers for the conference call **506**. The PBX/voice-mail interface monitors the calls and first determines whether the call to the conference organizer was successful **508**. If this call fails then there is no point in having a conference, so the call is dropped and the command aborted **510**. If the organizer is in coverage and the call is answered the PBX system **120** is instructed to continue with the conference and make the remaining phone calls to the conference attendees **512**. During this step a timer is started to ensure that the command does not wait forever for calls that cannot be completed **514**. The system also waits and watches for completed phone circuits for the conference attendees **516**. If an attendee does answer the call the conference call timer is lengthened **518**, but this is only done once. Since the call has started successfully, with at least one attendee the other call attempts can be allowed to wait longer **518**. Each time an attendee is connected an optional short message is played telling them they are starting a conference call—the organizer's name may also be part of this recorded message **520**. The new call is then bridged into the organizer's circuit and the call can be considered started **520**. A test is performed to see if this call was the last attendee expected **522** and if so the conference is continues and no further waiting is performed for new circuits. Otherwise the software returns to wait for additional circuits to be closed—i.e. calls to be answered **516**. If the call conference timer expires **526**, it may be a short or longer timer that has expired **526**. A check is performed to see if any of the calls that were attempted were successful **528**. If no call was successful in the allotted time, all circuits are closed, all pending calls terminated and the organizer's circuit is also closed **530**. Otherwise, all pending circuits are closed and the conference continues with those parties that have answered their phones **524**.

Turning now to FIG. **10** this data flow illustrates the embodiment of the invention highlighted in FIG. **7**. In this example an incoming call arrives and the mobile device **100** is told of the incoming call and given a choice of various actions. This data flow starts with the arrival of the call into the PBX system **120** associated to the user **600**. This could be within the network carrier, in an ASP/ISP environment, or within the corporate office. If the call is answered by the user **602**, then there is nothing to do and the call is accepted **604**. Otherwise the call is detected by the PBX/voice-mail interface, via the API provided by the PBX system **606**. The PBX/voice-mail interface determines whether the user receiving the call has a mobile device **608**. If the user does not have a mobile device **100** the call is allowed to go into voice mail **610**. Otherwise the PBX is requested by the PBX/voice-mail interface **210***c* to hold the call and play a 'please hold while we contact the user' message **612**. A summary of the call is sent to the mobile device **100** that includes the caller id, time of call and any other information that might exist **614**. The call-holding summary message is placed in the unified messaging system storage area **215**, so that it can be delivered by the unified messaging system to the mobile device **616**. After the message is sent the PBX/voice-mail interface runs a timer to ensure the call on hold does not wait too long **618**. If the mobile device **100** is out of coverage it is possible the message will take too long to reach the user. Once the message is received the user has to decide quickly to act upon the message. If they ignore the message or decide to do nothing then a default action will be taken **620**. In most cases the default action will be to send the caller into voice-mail; but for one skilled in the art any number of configured choices are possible. If they ignore the message, or if they take too long and the timer expires, the call will be sent into voice-mail **624**. If the user does act upon the message they can make a selection from various choices like hangup, send to voice-mail and forward to the mobile device **100**. These are just a few choices, but there could also be a forwarded to another phone number that does not belong to the user being called or another canned message could be played. When the command is selected by the user it is packaged into a format understood by the unified messaging server **115** and sent back over the wireless network to the unified messaging server **628**. The unified message server **115** detects that this is a PBX and voice-mail command and passes the message to the PBX/voice-mail interface **630**. The PBX/voice-mail interface then instructs the PBX/voice-mail sub-system **120** what to do with the held call **632**. In this situation the PBX system **120** either hangs up the call, sends it to voice mail, or forwards on to the user's mobile device **634**.

These are four examples of many preferred embodiments of a method and system for remotely controlling a host system from a dual-mode communications device. This invention also makes direct use of the patented invention for pushing information to a mobile data communications device. These two inventions augment each other to produce a dual-mode resulting action on a single device. Another interesting advanced implementation might allow a user of a dual-mode phone to co-ordinate a three-way video-phone call from the mobile device.

It will be appreciated that the above description relates to a preferred embodiment by way of example only. Many variations on the invention will be within the scope of those knowledgeable in the field, and such variations are within the scope of the invention as described and claimed, whether or not expressly described.

We claim:

1. A method for processing a voice mail message stored at a unified messaging system using a wireless device configured to communicate over a wireless data channel and a circuit switched wireless voice channel, the method comprising:

receiving a notification signal at the wireless device via the wireless data channel indicating that the unified messaging system received and stored a voice mail message intended for a user of the wireless device;

transmitting a command signal from the wireless device to the unified messaging system via the wireless data channel, the command signal including a voice mail message retrieval command;

receiving via the circuit switched wireless voice channel a voice call initiated by a voice mail system component of

the unified messaging system in response to the voice mail message retrieval command transmitted from the wireless device; and

receiving the voice mail message from the unified messaging system via the circuit switched wireless voice channel.

2. The method of claim **1**, further comprising the notification signal including information regarding the voice mail message, the information being displayed on a display interface of the wireless device, the display interface providing one or more commands for processing the voice mail message, wherein one of the one or more commands includes the message retrieval command.

3. The method of claim **1**, further comprising playing the voice mail message on the wireless device.

4. The method of claim **2**, wherein the notification signal received from the unified messaging system comprises an e-mail message including the information regarding the voice mail message.

5. The method of claim **1**, wherein the information regarding the voice mail message comprises at least one of a message waiting indicator, a voice mail reference identification, a voice mail access telephone number, a caller identification, or a date and time of the voice mail message.

6. The method of claim **1**, wherein the notification signal received from the unified messaging system comprises one of an e-mail message, an SMS message, an Internet Message Service message, an Enhanced Messaging Service message, or a Multi-Media Messaging Service message.

7. The method of claim **1**, further comprising:

displaying a command list at the wireless device, the command list including one or more commands associated with voice mail operations; and

selecting and transmitting one of the commands on the command list from the wireless device to the unified messaging system to remotely control the operation of the unified messaging system.

8. The method of claim **7**, further comprising:

for each of the commands on the command list, configuring the wireless device to output a voice mail system operating command; and

after a command is selected, transmitting the voice mail system operating command from the wireless device to the unified messaging system.

9. The method of claim **8**, wherein the voice mail system operating command comprises a sequence of one or more Dual-Tone Multiple Frequency (DTMFI) signals.

10. A unified messaging system, configured to communicate with a wireless device over a circuit switched wireless data channel and a wireless voice channel, comprising:

means for storing voice mail messages associated with a user of the wireless device;

means for detecting a stored voice mail message associated with a user of the wireless device;

means for transmitting a notification signal to the wireless device via the wireless data channel;

means for receiving a command signal including a voice mail message retrieval command from the wireless device via the wireless data channel;

means for initiating a voice call via the circuit switched wireless voice channel to the wireless device; and

means for transmitting the voice mail message to the wireless device via the circuit switched wireless voice channel.

11. The system of claim **10**, wherein the notification signal includes information regarding the voice mail message.

12. The system of claim **10**, wherein the unified messaging system is interfaced with a private branch exchange (PBX) system.

13. The system of claim **12**, wherein the PBX system receives a voice call and routes the voice call to the unified messaging system.

14. The system of claim **12**, wherein the unified messaging system is integrated into the PBX system.

15. A wireless device capable of communicating via a wireless data network and a wireless voice network, the wireless device for use in conjunction with a unified messaging system that receives a voice call and stores a voice mail message in a data store associated with a user of the wireless device, comprising:

means for receiving a notification signal via the wireless data network, the notification signal indicating that the voice mail message is stored at the unified messaging system; and

means for transmitting a voice mail message retrieval command from the wireless device to the unified messaging system via the wireless data network;

wherein the message retrieval command causes the unified messaging system to initiate a voice call to the wireless device via a circuit switched voice communications channel, the wireless device including means for automatically answering the voice call and receiving the stored voice mail message via the circuit switched voice communications channel.

16. The wireless device of claim **15**, further comprising a graphical display capable of displaying to the user of the wireless device a graphical interface for initiating one or more voice mail commands.

17. The wireless device of claim **16**, wherein the one or more voice mail commands include at least one command designed to initiate retrieval of a voice mail message from the unified messaging system.

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